No. 9100217

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Plant Breeders 1 Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT IETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. E UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Mac-1'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 30th *day of* December *in the year of our Lord one thousand nine hundred and* ninety-three.

Attest:

Kenneth R. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Agriculture, Clearance Office, OIRM, Room 404-W, Washington, D.C. 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0581-0055), Washington, 20250.

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Plant Breeders 1 Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
PB1-85-WW-1

3. VARIETY NAME
MAC-1

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
851 East 7th Street
Moscow, Idaho
83843

5. PHONE *(Include area code)*
(208)882-4483

FOR OFFICIAL USE ONLY

PVPO NUMBER
9100217

FILING
Date: July 17, 1991
Time: ☐ A.M. ☐ P.M.

FEES RECEIVED
Filing and Examination Fee: $ 2150.00
Date: July 17, 1991
Certificate Fee: $ 250.00
Date: Nov. 18, 1993

6. GENUS AND SPECIES NAME
Triticum aestivum

7. FAMILY NAME *(Botanical)*
Gramineae

8. CROP KIND NAME *(Common Name)*
Wheat

9. DATE OF DETERMINATION
August, 1985

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Idaho

12. DATE OF INCORPORATION
January 1, 1985

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Wayne L. McProud
851 East 7th Street
Moscow, Idaho 83843

(208)882-4483
PHONE *(Include area code)*:

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____.
- g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☒ YES *(If "YES," answer items 16 and 17 below)* ☐ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☒ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☒ FOUNDATION ☒ REGISTERED ☒ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____.)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is ~~(are) informed~~ that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Wayne L McProud	President PB1	July 15, 1991
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

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REVISED EXHIBIT A: Origin and breeding history of 'Mac-1'

Plant Breeders 1 Inc. (PB1) developed a soft white winter wheat population based on 53 1979 crosses where the variety 'Daws' was used as the common male parent. The female parents were various selections made from a CIMMYT, Oregon State University International Winter Wheat Breeding Program bulk population. This 'Daws' based population was grown as a bulk through the F4 generation. In 1983 numerous single plant selections were made, including the plant giving rise to 'Mac-1'. In 1984 these single plant selections were grown as head hills in PB1's screening trial. Hill selections from the screening trial were based on yield and agronomic traits. In 1985 and in succeeding years 'Mac-1' was tested in PB1's preliminary, intermediate and advanced yield trials. 'Mac-1' has remained stable and uniform since its selection as a 1984 head hill. In 1990 'Mac-1' was head hilled in preparation for the 1991 breeders seed increase. 'Mac-1' is composed of 135 separately maintained sub lines.

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EXHIBIT A: Origin and breeding history of 'MAC-1' ~~'PB1-85-WW-1'~~

2/18/92

Plant Breeders 1 Inc. (PB1) developed a soft white winter wheat population based on 53 1979 crosses where the variety 'Daws' was used as the common male parent. The female parents were various selections made from a CIMMYT, Oregon State University International Winter Wheat Breeding Program bulk population. This 'Daws' based population was grown as a bulk through the F4 generation. In 1983 numerous single plant selections were made, including the plant giving rise to the line 'PB1-85-WW-1'. In succeeding years lines from these 1983 single plant selections were tested in PB1's screening, preliminary, intermediate and advanced trials. In 1990 'PB1-85-WW-1' was head hilled in preparation for the 1991 breeders seed increase. 'PB1-85-WW-1', which is composed of 135 separately maintained sub lines, is stable and uniform.

EXHIBIT B: Novelty statement

'mac-1'

~~'PB1-85-WW-1'~~ is most similar to the soft white winter wheat variety 'Daws'. 'PB1-85-WW-1' heads about 2.2 days earlier than does 'Daws' (Table 1) and is about 11.5 cm taller than is 'Daws' (Table 2). At booting 'PB1-85-WW-1's flag leaf is erect while the 'Daws' flag leaf droops. In phenol reaction 'PB1-85-WW-1' is fawn color while 'Daws' is 60% fawn and 40% dark brown.

TABLE 1: COMPARING ~~'PB1-85-WW-1'~~ 'mac-1' AND 'DAWS' FOR HEADING DATES *

YEAR/LOCATION	PB1-85-WW-1	DAWS
1986 Culdesac ID	150	150
1987 Culdesac ID	133	138
1988 Culdesac ID	153	155
1989 Culdesac ID	151	153
1990 Culdesac ID	145	147
Average	146.4	148.6

* Heading dates expressed in days from January 1

TABLE 2: COMPARING ~~'PB1-85-WW-1'~~ 'mac-1' AND 'DAWS' FOR PLANT HEIGHT *

YEAR/LOCATION	PB1-85-WW-1	DAWS
1986 Culdesac ID	106.7	81.3
1987 Culdesac ID	101.6	86.4
1988 Culdesac ID	114.3	99.1
1989 Culdesac ID	99.1	88.9
1989 Genesee ID	96.5	83.8
1989 Gold Hill ID	78.7	71.1
1989 Hatter Creek ID	81.3	73.7
1990 Culdesac ID	106.7	104.1
1990 Hatter Creek ID	96.5	88.9
Average	97.9	86.4

* Height expressed in centimeters

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-6
(2-15-73)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Plant Breeders 1 Inc.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
851 East 7th Street
Moscow, Idaho 83843

FOR OFFICIAL USE ONLY

PVPO NUMBER
9100217

VARIETY NAME OR TEMPORARY DESIGNATION
MAC-1

2/18/93

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:

[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

[2] 1 = SPRING 2 = WINTER 3 = OTHER *(Specify)* _____ [1] 1 = SOFT 2 = HARD 3 = OTHER *(Specify)* _____

[1] 1 = WHITE 2 = RED 3 = OTHER *(Specify)* _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

[2][2][7] FIRST FLOWERING [2][3][7] LAST FLOWERING

4. MATURITY *(50% Flowering)*:

[0][1] NO. OF DAYS *EARLIER* THAN ..... [5] 1 = ARTHUR 2 = SCOUT 3 = CHRIS

[ ][ ] NO. OF DAYS *LATER* THAN ..... [ ] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT *(From soil level to top of head)*:

[0][9][8] CM. HIGH

[1][2] CM. TALLER THAN ..... [5] 1 = ARTHUR 2 = SCOUT 3 = CHRIS

[ ][ ] CM. SHORTER THAN ..... [ ] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING *(See reverse)*:

[3] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:

[1] 1 = YELLOW 2 = PURPLE

8. STEM:

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom: 1 = ABSENT 2 = PRESENT

[2] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

[1] Internodes: 1 = HOLLOW 2 = SOLID

[0][4] NO. OF NODES *(Originating from node above ground)*

[2][5] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

[2] Anthocyanin: 1 = ABSENT 2 = PRESENT

[2] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

[1] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER *(Specify)*: _____

[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED

[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

[2][2] MM. LEAF WIDTH *(First leaf below flag leaf)*

[3][1] CM. LEAF LENGTH *(First leaf below flag leaf)*:

5

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11. HEAD:

[1] Density: 1 = LAX 2 = DENSE

[2] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER *(Specify)* _____

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER *(Specify)*: _____

[1 4] CM. LENGTH [1 7] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT *(CA. 7 mm.)* 2 = MEDIUM *(CA. 8 mm.)* 3 = LONG *(CA. 9 mm.)*

[3] Width: 1 = NARROW *(CA. 3 mm.)* 2 = MEDIUM *(CA. 3.5 mm.)* 3 = WIDE *(CA. 4 mm.)*

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[3] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[2] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[2] Phenol reaction *(See instructions)*: 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[1] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER *(Specify)* _____

[0 7] MM. LENGTH [0 3] MM. WIDTH [4 2] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[2] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] STEM RUST *(Races)* _____ [0] LEAF RUST *(Races)* _____ [0] STRIPE RUST *(Races)* _____ [0] LOOSE SMUT

[0] POWDERY MILDEW [0] BUNT [0] OTHER *(Specify)* _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID *(Bydv.)* [0] GREEN BUG [0] CEREAL LEAF BEETLE

[0] OTHER *(Specify)* _____ HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Daws	Seed size	Daws
Leaf size	Daws	Seed shape	Daws
Leaf color	Daws	Coleoptile elongation	Daws
Leaf carriage		Seedling pigmentation	Daws

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. *(See attachment.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

JUL 7 1994

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REVISED EXHIBIT: D Additional description of 'Mac-1'

'Mac-1' is a common soft white winter wheat, Triticum aestivum L.

When seed at Culdesac, Idaho, on or about October 8, 'Mac-1's' heading date is May 26 or two (2) days later than 'Stephens' and two (2) days earlier than 'Daws'. 'Mac-1's' coleoptile color is white; juvenile growth erect; tillering high; at booting plant color blue green to green, flag leaf erect, twisted, with waxy bloom; first leaf below flag leaf wide (average 21.8 mm), long (average 311.6 mm); auricales show anthocyanin, being particularly pronounced at booting; stem waxy, strong, hallow internodes, averaging 4 above ground nodes, lacks anthocyanin; plant height mid tall (averages 98 cm); anthers yellow.

'Mac-1's' spike is awned, long (averages 13.5 cm),mid wide (averages 16.7 cm), strap, lax, at maturity erect, white to amber in color, hairs along edge of last rachis internode; shattering low. Mature glumes are white to amber, long (averages 10 mm), wide (averages 4.5 mm); glume shoulders narrow, oblique; glume beak narrow, mid long, acuminate.

The seed of 'Mac-1' is white, averaging 7.2 mm long and 3.4mm wide, oval to ovate; bush mid to large, mid long, not collared; crease narrow to mid wide, shallow to mid deep; cheeks rounded; germ medium; phenol reaction fawn.

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QUALITY DATA PRESENTED IN THE FOLLOWING EIGHT TABLES WERE COLLECTED BY THE USDA/ARS WESTERN WHEAT QUALITY LABORATORY LOCATED IN PULLMAN, WASHINGTON AND BY UNIVERSITY OF IDAHO QUALITY LABORATORY LOCATED IN ABERDEEN, IDAHO.

TABLE 1: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR TEST WEIGHT *

Year/Location	Mac-1	Stephens	Daws
1990 Culdesac ID	60.0	54.0	59.0
1989 Culdesac ID	63.2	62.0	62.8
1988 Culdesac ID	61.2	58.4	59.6
1987 Culdesac ID	61.6	59.2	62.8
1986 Culdesac ID	62.8	60.4	62.0
Average	61.76	58.80	61.24

* Test weight expressed in pounds per bushel

TABLE 2: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR FLOUR YIELDS *

Year/Location	Mac-1	Stephens	Daws
1989-90 South ID	67.7	65.6	61.6
1990 Culdesac ID	74.3	73.7	71.3
1989 Culdesac ID	71.1	72.7	70.2
1988 Culdesac ID	71.2	71.6	67.8
1987 Culdesac ID	71.6	70.0	66.2
1986 Culdesac ID	71.8	73.6	70.2
Average	71.28	71.20	67.88

* Flour yields expressed as percentage of flour obtained

TABLE 3: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR FLOUR ASH *

Year/Location	Mac-1	Stephens	Daws
1990 Culdesac ID	0.46	0.52	0.55
1989 Culdesac ID	0.31	0.35	0.33
1988 Culdesac ID	0.33	0.36	0.33
1987 Culdesac ID	0.31	0.30	0.27
1986 Culdesac ID	0.35	0.42	0.39
Average	0.352	0.390	0.374

* Flour ash percentage at 14% moisture basis

TABLE 4: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR MILLING SCORE *

Year/ Location	Mac-1	Stephens	Daws
1990 Culdesac ID	86.5	82.1	77.1
1989 Culdesac ID	91.6	91.1	89.8
1988 Culdesac ID	90.4	89.1	86.2
1987 Culdesac ID	92.6	91.0	88.0
1986 Culdesac ID	90.1	87.8	85.9
Average	90.24	88.22	85.40

* Milling score = [(80 - flour yield) + 50 (flour ash - 0.30) + 0.48 (milling time - 12.5) + 0.5 (65 - % long patent) + 0.5 (16 - first tempering moisture)]

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TABLE 5: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR FLOUR PROTEIN *

Year/Location	Mac-1	Stephens	Daws
1989-90 South ID	10.3	9.6	8.7
1990 Culdesac ID	11.3	11.1	10.4
1989 Culdesac ID	10.6	10.3	9.5
1988 Culdesac ID	10.6	10.2	9.9
1987 Culdesac ID	10.3	9.8	10.0
1986 Culdesac ID	11.4	10.1	10.2
Average	10.75	10.18	9.78

* Flour protein percentage at 14% moisture basis

TABLE 6: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR MIXOGRAPH ABSORPTION *

Year/Location	Mac-1	Stephens	Daws
1990 Culdesac ID	55.9	56.0	55.8
1989 Culdesac ID	54.7	54.7	56.1
1988 Culdesac ID	59.3	57.9	58.6
1987 Culdesac ID	54.3	55.9	56.1
1986 Culdesac ID	57.0	57.9	58.4
Average	56.24	56.48	57.00

* Mixograph absorption corrected for protein (%)

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TABLE 7: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR COOKIE DIAMETER *

Year/Location	Mac-1**	Stephens**	Daws**
1989-90 South ID	8.87	8.84	8.87
1990 Culdesac ID	8.85 [8.91]	9.21 [9.25]	8.31 [8.27]
1989 Culdesac ID	9.18 [9.13]	9.01 [8.94]	9.14 [8.97]
1988 Culdesac ID	8.91 [8.87]	9.19 [9.10]	8.87 [8.65]
1987 Culdesac ID	9.26 [9.30]	9.32 [9.30]	9.05 [9.05]
1986 Culdesac ID	8.92 [8.97]	9.29 [9.19]	8.90 [8.81]
Average	9.00 [9.04]	9.14 [9.17]	8.86 [8.75]

* Cookie diameter expressed in centimeters

** Inside parenthesis cookie diameter (cm) corrected for protein to mean protein of nursery

TABLE 8: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1' 'STEPHENS' AND 'DAWS' FOR MIXOGRAPH TYPE

Year/location	Mac-1	Stephens	Daws
1990 Culdesac ID	1M	2M	3M
1989 Culdesac ID	1M	2M	4M
1988 Culdesac ID	1M	1M	3M
1987 Culdesac ID	2M	3M	5M
1986 Culdesac ID	2M	2M	2M

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TABLE 1: COMPARING THE SOFT WHITE WINTER WHEATS 'MAC-1', 'JOHN', 'STEPHENS' AND 'NUGAINES' FOR LEAF RUST RESISTANCE *

Variety	Location **	
	Walla Walla	Mount Vernon
1992 Western Regional Winter Wheat Trials		
Mac-1	2	1
John	20	95
Stephens	30	70
Nugaines	30	90
1992 Winter Cereal Disease Nursery		
Mac-1	0	5
John	60	80
Stephens	60	90
Nugaines	50	80

* Data collected by R. F. Line, USDA-ARS, Washington State University, Pullman, Washington

** Leaf rust data expressed as a percentage of leaf area covered with pustules

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EXHIBIT E: Basis of ownership

Plant Breeders 1 Inc. of Moscow, Idaho, is the breeder of the soft white winter wheat '~~PB1-85-WW-1~~ MAC-I'.

2/18/92